

Amendments to the Claims

This listing of claims replaces all prior versions and listings of claims in the application.

Listing of Claims

1. (Currently Amended) A method of driving a semiconductor display device, the semiconductor display device comprising:

an opposing electrode;

a plurality of pixels, each containing of which comprises:

a pixel TFT; [[and]]

a pixel electrode; an opposing electrode; and

a liquid crystal formed between the pixel electrode and the opposing electrode; and

a plurality of signal lines, each of which is electrically connected to multiple pixel TFTs,

the method comprising the steps of:

wherein inputting display signals are input to the pixel electrode electrodes of the pixels through the pixel [[TFT,]] TFTs; and

displaying an image corresponding to the display signals during a frame period,

wherein each of the display signals input to the pixel electrode has one of a positive polarity and a negative polarity [[, with]] relative to an electric potential of the opposing electrode as a standard, in accordance with a polarity pattern;

wherein the polarity pattern is maintained during the frame period, and irregularly changed to another polarity pattern after the frame period;

wherein display signals input to pixel electrodes in a vertical line have having a same polarity are input to the pixel electrodes through the pixel TFTs connected to one of the plurality of signal lines; and

wherein polarities of the display signals are the same polarity is independently controlled for each of the plurality of signal lines, for each vertical line of the plurality of pixels, and wherein pixels to which display signals having a particular polarity are input are changed irregularly in a certain fixed period.

2. (Currently Amended) A method of driving a semiconductor display device, the semiconductor display device comprising:

an opposing electrode;

a plurality of pixels, each of which comprises: containing

a pixel TFT; [[and]]

a pixel electrode; an opposing electrode; and

a liquid crystal formed between the pixel electrode and the opposing electrode; and

a plurality of signal lines, each of which is electrically connected to multiple pixel TFTs,

the method comprising the steps of:

wherein inputting display signals are input to the pixel electrode electrodes of the pixels through the pixel [[TFT,]] TFTs; and

displaying an image corresponding to the display signals during a frame period,

wherein each of the display signals input to the pixel electrode has one of a positive polarity and a negative polarity [[, with]] relative to an electric potential of the opposing electrode as a standard, in accordance with a polarity pattern;

wherein the polarity pattern is maintained during the frame period, and irregularly changed to the another polarity pattern after the frame period so that flicker becomes difficult to observe;

wherein display signals input to pixel electrodes in a vertical line have having a same polarity are input to the pixel electrodes through the pixel TFTs connected to one of the plurality of signal lines; and

~~the same polarity is wherein polarities of the display signals are independently controlled for each of the plurality of signal lines, for each vertical line of the plurality of pixels, and wherein pixels to which display signals having a particular polarity are input are changed irregularly in a certain fixed period, to an extent that flicker becomes difficult to observe.~~

3. (Currently Amended) A method of driving a semiconductor display device, the semiconductor display device comprising:

an opposing electrode;

a plurality of pixels, each containing of which comprises:

a pixel TFT; [[and]]

a pixel electrode; an opposing electrode; and

a liquid crystal formed between the pixel electrode and the opposing electrode; and

a plurality of signal lines, each of which is electrically connected to multiple pixel TFTs,

the method comprising the steps of:

wherein inputting display signals are input to the pixel electrode electrodes of the pixels through the pixel [[TFT,]] TFTs; and

displaying an image corresponding to the display signals during a frame period,

wherein each of the display signals input to the pixel electrode has one of a positive polarity and a negative polarity [[, with]] relative to an electric potential of the opposing electrode as a standard in accordance with a polarity pattern;

wherein the polarity pattern is maintained during the frame period, and irregularly changed to another polarity pattern after the frame period so that vertical striping becomes difficult to observe;

wherein display signals input to pixel electrodes in a vertical line have having a same polarity are input to the pixel electrodes through the pixel TFTs connected to one of the plurality of signal lines; and

~~the same polarity is wherein polarities of the display signals are independently controlled for each of the plurality of signal lines. for each vertical line of the plurality of pixels, and wherein pixels to which display signals having a particular polarity are input are changed irregularly in a certain fixed period, to an extent that vertical striping becomes difficult to observe.~~

4. (Currently Amended) A method of driving a semiconductor display device, the semiconductor display device comprising:

an opposing electrode;

a plurality of pixels, each containing of which comprises:

a pixel TFT; [[and]]

a pixel electrode; ~~an opposing electrode;~~ and

a liquid crystal formed between the pixel electrode and the opposing electrode;

and

a plurality of signal lines, each of which is electrically connected to multiple pixel TFTs, the method comprising the steps of:

wherein inputting display signals are input to the pixel electrode electrodes of the pixels through the pixel [[TFT,]] TFTs; and

displaying an image corresponding to the display signals during a frame period,

wherein each of the display signals input to the pixel electrode has one of a positive polarity and a negative polarity [[, with]] relative to an electric potential of the opposing electrode as a standard in accordance with a polarity pattern;

wherein the polarity pattern is maintained during the frame period, and randomly changed to another polarity pattern after the frame period; and

wherein the pixel electrodes are arranged in multiple vertical lines and polarities of the display signals input to the pixel electrodes through the pixel TFTs connected to one of the plurality of signal lines are changed in a vertical line change together, and

~~wherein a particular polarity of display signals input to the pixels electrodes in the vertical line is changed randomly in a certain fixed period.~~

5. (Canceled)

6. (Previously Presented) A method of driving a semiconductor display device according to claim 1, wherein a polarity of display signals input to only some of the pixel electrodes changes in two adjacent frame periods.

7. (Currently Amended) A semiconductor display device comprising:

a source signal line driver circuit;

a gate signal line driver circuit;

a plurality of source signal lines;

a plurality of gate signal lines;

a pixel portion; and

a display signal generation portion,

wherein the pixel portion has a plurality of pixels, each containing a pixel TFT and a pixel electrode; [ , ]

wherein the display signal generation portion [[has:]] comprises a control portion, [[ ; ]] a polarity data signal generation portion, [[ ; ]] an alternating current signal generation portion, [[ ; ]] a display signal selection portion, [[ ; ]] a + side display signal generation portion, [[ ; ]] and a - side display signal generation portion, [[ ; ]]

wherein display signals are generated in the display signal generating portion and input to the plurality of source signal lines through the source signal line driver circuit;

wherein an image corresponding to the display signals is displayed during a frame period;

wherein a polarity pattern corresponding to the display signals is maintained during the frame period, and irregularly changed to another polarity pattern after the frame period;

~~wherein display signals input to pixel electrodes in a vertical line have having a same polarity are input to the pixel electrodes through the pixel TFTs connected to one of the plurality of source signal lines; and~~

~~the same polarity is wherein polarities of the display signals are independently controlled for each of the plurality of source signal lines. for each vertical line of the plurality of pixels, and~~

~~wherein pixels to which display signals having a particular polarity are input are changed irregularly in a certain fixed period.~~

8. (Currently Amended) A semiconductor display device comprising:  
a source signal line driver circuit;  
a gate signal line driver circuit;  
a plurality of source signal lines;  
a plurality of gate signal lines;  
a pixel portion; and  
a display signal generation portion,

wherein the pixel portion has a plurality of pixels, each containing a pixel TFT and a pixel electrode; [ , ]

wherein the display signal generation portion [[has:]] comprises a control portion, [[;]] a polarity data signal generation portion, [[;]] an alternating current signal generation portion, [[;]] a display signal selection portion, [[;]] a + side display signal generation portion, [[;]] and a - side display signal generation portion, [[;]]

wherein display signals are generated in the display signal generating portion and input to the plurality of source signal lines through the source signal line driver circuit;

wherein an image corresponding to the display signals is displayed during a frame period;  
wherein a polarity pattern corresponding to the display signals is maintained during the frame period, and irregularly changed to another polarity pattern after the frame period so that flicker becomes difficult to observe;

wherein display signals ~~input to pixel electrodes in a vertical line have having~~ a same polarity ~~are input to the pixel electrodes through the pixel TFTs connected to one of the plurality of source signal lines;~~ and

~~wherein polarities of the display signals are the same~~ polarity is independently controlled for each of the plurality of source signal lines. ~~for each vertical line of the plurality of pixels,~~ and

~~wherein pixels to which display signals having a particular polarity are input are changed irregularly in a certain fixed period, to an extent that flicker becomes difficult to observe.~~

9. (Currently Amended) A semiconductor display device comprising:

a source signal line driver circuit;

a gate signal line driver circuit;

a plurality of source signal lines;

a plurality of gate signal lines;

a pixel portion; and

a display signal generation portion,

wherein the pixel portion has a plurality of pixels, each containing a pixel TFT and a pixel electrode; [[,]]

wherein the display signal generation portion [[has:]] comprises a control portion, [[;]] a polarity data signal generation portion, [[;]] an alternating current signal generation portion, [[;]] a display signal selection portion, [[;]] a + side display signal generation portion, [[;]] and a - side display signal generation portion, [[;]]

wherein display signals are generated in the display signal generating portion and input to the plurality of source signal lines through the source signal line driver circuit;

wherein an image corresponding to the display signals is displayed during a frame period;

wherein a polarity pattern corresponding to the display signals is maintained during the frame period, and irregularly changed to another polarity pattern after the frame period so that vertical striping becomes difficult to observe;

wherein display signals ~~input to pixel electrodes in a vertical line have having~~ a same polarity ~~are input to the pixel electrodes through the pixel TFTs connected to one of the plurality of source signal lines; and~~

~~the same polarity is wherein polarities of the display signals are independently controlled for each of the plurality of source signal lines. for each vertical line of the plurality of pixels, and~~

~~wherein pixels to which display signals having a particular polarity are input are changed irregularly in a certain fixed period, to an extent that vertical striping becomes difficult to observe.~~

10. (Currently Amended) A semiconductor display device comprising:

a source signal line driver circuit;

a gate signal line driver circuit;

a plurality of source signal lines;

a plurality of gate signal lines;

a pixel portion; and

a display signal generation portion,

wherein the pixel portion has a plurality of pixels, each containing a pixel TFT and a pixel electrode; [,.]

wherein the display signal generation portion [[has:]] comprises a control portion, [[;]] a polarity data signal generation portion, [[;]] an alternating current signal generation portion, [[;]] a display signal selection portion, [[;]] a + side display signal generation portion, [[;]] and a - side display signal generation portion, [[;]]

wherein display signals are generated in the display signal generating portion and input to the plurality of source signal lines through the source signal line driver circuit;

wherein an image corresponding to the display signals is displayed during a frame period;

wherein a polarity pattern corresponding to the display signals is maintained during the frame period, and randomly changed to another polarity pattern after the frame period; and

~~wherein the pixel electrodes are arranged in multiple vertical lines and polarities of the display signals input to the pixel electrodes in a vertical line change through the pixel TFTs connected to one of the plurality of source signal lines are changed together, ,and~~

~~wherein a particular polarity of display signals input to the pixels electrodes in the vertical line is changed randomly in a certain fixed period.~~

11. (Previously Presented) A semiconductor display device according to claim 7, wherein a polarity of display signals input to only some of the pixel electrodes changes in two adjacent frame periods.

12. (Currently Amended) A method of driving a semiconductor display device, the semiconductor display device comprising:

an opposing electrode;

a plurality of pixels, each containing of which comprises:

a pixel TFT; [[and]]

a pixel electrode; ~~an opposing electrode;~~ and

a liquid crystal formed between the pixel electrode and the opposing electrode; and

a plurality of signal lines, each of which is electrically connected to multiple pixel TFTs,

the method comprising the steps of:

wherein inputting display signals are input to the pixel electrode electrodes of the pixels through the pixel [[TFT,]] TFTs; and

displaying an image corresponding to the display signals during a frame period,

wherein each of the display signals input to the pixel electrode has one of a positive polarity and a negative polarity [[, with]] relative to an electric potential of the opposing electrode as a standard, in accordance with a polarity pattern;

wherein the polarity pattern is maintained during the frame period, and randomly changed to another polarity pattern after the frame period so that flicker becomes difficult to observe; and

~~wherein the pixel electrodes are arranged in multiple vertical lines and polarities of the display signals input to the pixel electrodes through the pixel TFTs connected to one of the plurality of signal lines are changed in a vertical line change together, , and~~

~~wherein a particular polarity of display signals input to the pixels electrodes in the vertical line is changed randomly in a certain fixed period, to an extent that flicker becomes difficult to observe.~~

13. (Currently Amended) A semiconductor display device comprising:

- a source signal line driver circuit;
- a gate signal line driver circuit;
- a plurality of source signal lines;
- a plurality of gate signal lines;
- a pixel portion; and
- a display signal generation portion,

wherein the pixel portion has a plurality of pixels, each containing a pixel TFT and a pixel electrode; [,.]

wherein the display signal generation portion [[has:]] comprises a control portion, [[;]] a polarity data signal generation portion, [[;]] an alternating current signal generation portion, [[;]] a display signal selection portion, [[;]] a + side display signal generation portion, [[;]] and a - side display signal generation portion, [[;]]

wherein display signals are generated in the display signal generating portion and input to the plurality of source signal lines through the source signal line driver circuit;

wherein an image corresponding to the display signals is displayed during a frame period;

wherein a polarity pattern corresponding to the display signals is maintained during the frame period, and randomly changed to another polarity pattern after the frame period so that flicker becomes difficult to observe; and

wherein the pixel electrodes are arranged in multiple vertical lines and polarities of the display signals input to the pixel electrodes in a vertical line change through the pixel TFTs connected to one of the plurality of source signal lines are changed together, , and

wherein a particular polarity of display signals input to the pixels electrodes in the vertical line is changed randomly in a certain fixed period, to an extent that flicker becomes difficult to observe.

14. (Currently Amended) A semiconductor display device comprising:

a source signal line driver circuit;

a gate signal line driver circuit;

a plurality of source signal lines;

a plurality of gate signal lines;

a pixel portion; and

a display signal generation portion,

wherein the pixel portion has a plurality of pixels, each containing a pixel TFT and a pixel electrode; [ , ]

wherein the display signal generation portion [[has:]] comprises a control portion, [[ ; ]] a polarity data signal generation portion, [[ ; ]] an alternating current signal generation portion, [[ ; ]] a display signal selection portion, [[ ; ]] a + side display signal generation portion, [[ ; ]] and a - side display signal generation portion, [[ ; ]]

wherein display signals are generated in the display signal generating portion and input to the plurality of source signal lines through the source signal line driver circuit;

wherein an image corresponding to the display signals is displayed during a frame period;

wherein a polarity pattern corresponding to the display signals is maintained during the frame period, and irregularly changed to another polarity pattern after the frame period so that vertical striping becomes difficult to observe;

wherein polarities of the display signals input to pixel electrodes in a vertical line change through the pixel TFTs connected to one of the plurality of signal lines are changed together, and

wherein pixels to which display signals having a particular polarity are input are changed irregularly in a certain fixed period, to an extent that vertical striping becomes difficult to observe.

15. (Previously Presented) A method of driving a semiconductor display device according to claim 12, wherein a polarity of display signals input to only some of the pixel electrodes changes in two adjacent frame periods.

16. (Canceled)

17. (Canceled)

18. (Previously Presented) A method of driving a semiconductor display device according to claim 2, wherein a polarity of display signals input to only some of the pixel electrodes changes in two adjacent frame periods.

19. (Previously Presented) A method of driving a semiconductor display device according to claim 3, wherein a polarity of display signals input to only some of the pixel electrodes changes in two adjacent frame periods.

20. (Previously Presented) A method of driving a semiconductor display device according to claim 4, wherein a polarity of display signals input to only some of the pixel electrodes changes in two adjacent frame periods.

21. (Previously Presented) A semiconductor display device according to claim 8, wherein a polarity of display signals input to only some of the pixel electrodes changes in two adjacent frame periods.

22. (Previously Presented) A semiconductor display device according to claim 9, wherein a polarity of display signals input to only some of the pixel electrodes changes in two adjacent frame periods.

23. (Previously Presented) A semiconductor display device according to claim 10, wherein a polarity of display signals input to only some of the pixel electrodes changes in two adjacent frame periods.

24. (Previously Presented) A method of driving a semiconductor display device comprising a plurality of pixels, each containing a pixel TFT and a pixel electrode; an opposing electrode; and a liquid crystal formed between the pixel electrode and the opposing electrode;

wherein display signals are input to the pixel electrode through the pixel TFT,

wherein each of the display signals input to the pixel electrode has one of a positive polarity and a negative polarity, with an electric potential of the opposing electrode as a standard,

wherein the pixel electrodes are arranged in multiple vertical lines and polarities of the display signals input to pixel electrodes in a vertical line change together, and

wherein a particular polarity of display signals input to the pixels electrodes in the vertical line is changed randomly in a certain fixed period, to an extent that vertical striping becomes difficult to observe.

25. (Previously Presented) A method of driving a semiconductor display device according to claim 24, wherein only some of pixel electrodes have an inverse polarity in two adjacent frame periods.

26. (Previously Presented) A semiconductor display device according to claim 13, wherein a polarity of display signals input to only some of pixel electrodes have an inverse polarity in two adjacent frame periods.

27. (Previously Presented) A semiconductor display device according to claim 14, wherein a polarity of display signals input to only some of pixel electrodes have an inverse polarity in two adjacent frame periods.

28. (Previously Presented) A method of driving a semiconductor display device according to claim 4, wherein the polarity of display signals input to all of the pixel electrodes in the vertical line is changed randomly in the certain fixed period.

29. (Previously Presented) A method of driving a semiconductor display device according to claim 4, wherein the polarities of display signals input to multiple ones of the vertical lines of pixel electrodes are changed randomly in the certain fixed period.

30. (Previously Presented) A semiconductor display device according to claim 10, wherein the polarity of display signals input to all of the pixel electrodes in the vertical line is changed randomly in the certain fixed period.

31. (Previously Presented) A semiconductor display device according to claim 10, wherein the polarities of display signals input to multiple ones of the vertical lines of pixel electrodes are changed randomly in the certain fixed period.

32. (Previously Presented) A method of driving a semiconductor display device according to claim 12, wherein the polarity of display signals input to all of the pixel electrodes in the vertical line is changed randomly in the certain fixed period.

33. (Previously Presented) A method of driving a semiconductor display device according to claim 12, wherein the polarities of display signals input to multiple ones of the vertical lines of pixel electrodes are changed randomly in the certain fixed period.

34. (Previously Presented) A semiconductor display device according to claim 13, wherein the polarity of display signals input to all of the pixel electrodes in the vertical line is changed randomly in the certain fixed period.

35. (Previously Presented) A semiconductor display device according to claim 13, wherein the polarities of display signals input to multiple ones of the vertical lines of pixel electrodes are changed randomly in the certain fixed period.

36. (Previously Presented) A method of driving a semiconductor display device according to claim 24, wherein the polarity of display signals input to all of the pixel electrodes in the vertical line is changed randomly in the certain fixed period.

37. (Previously Presented) A method of driving a semiconductor display device according to claim 24, wherein the polarities of display signals input to multiple ones of the vertical lines of pixel electrodes are changed randomly in the certain fixed period.

38. (Previously Presented) A semiconductor display device according to claim 14, wherein the polarity of display signals input to all of the pixel electrodes in the vertical line is changed randomly in the certain fixed period.

Applicant : Shigeru ONOYA  
Serial No. : 09/778,761  
Filed : February 8, 2001  
Page : 17 of 20

Attorney's Docket No.: 12732-013001 / US4610

39. (Previously Presented) A semiconductor display device according to claim 14, wherein the polarities of display signals input to multiple ones of the vertical lines of pixel electrodes are changed randomly in the certain fixed period.

40-47. (Canceled)